DECEMBER 1988

U.S. CUSTOMER SERVICE MARKET ANALYSIS

INPUT®

1280 Villa Street, Mountain View, California 94041-1194
(415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Customer Service Program
(CSP)

U.S. Customer Service Market Analysis

Copyright ©1988 by INPUT. All rights reserved.
Printed in the United States of America.
No part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

FLPA • 164 • 1988

Abstract

The purpose of this report is to size the current market for customer services in the U.S., as well as to provide growth expectations over a five-year forecast period. The report breaks down the U.S. customer services market into two major categories—manufacturer-supplied service and third-party maintenance (TPM) service. The report further breaks down each service submarket into product groupings: large systems (comprising supercomputers, mainframes, and minisupercomputers), small systems (comprising superminicomputers and traditional minicomputers), microcomputers/workstations (comprising business-use microcomputers, supermicrocomputers, and workstations), and peripherals (disk drives, tape drives, printers, and terminals).

The report also discusses key trends and occurrences that will effect service growth and delivery over the next five years.

The report contains 62 pages, including 37 exhibits.

Table of Contents

I Introduction 1

A. Scope 1
B. Methodology 2

II Executive Overview 5

A. U.S. Service Market: 1988-1993 5
B. U.S. Third-Party Maintenance Market, 1988-1993 7
C. IBM Continues Aggressive Service Policy Changes 7
D. System Availability Trends, 1983-1988 9

III Current Service Market Size and Forecast, 1988-1993 11

A. Research Forecast Methodology 11
B. U.S. Customer Service Market 12
  1. Current Market 12
  2. Forecasted Market Size 14
C. Large-System Service Market 16
D. Small-System Service Market 18
E. Third-Party Maintenance Service Market 20
F. Fourth-Party Maintenance Market 26

IV Customer Service Market Issues 29

A. Service Business Operations Analysis 29
  1. Manufacturer-based Service Organizations 29
  2. Third-Party Maintenance Service Organizations 32
B. Service Productivity Trends 35
C. User Service Requirement Trends 37
D. Manufacturer versus TPM Competition 41
E. 1988: The Year in Review 45

Table of Contents (Continued)

V Recommendations and Conclusions 51

A. Focus Items for Future Growth 51
B. Professional Services 56
C. Reconciliation with Previous Year's Forecasts 58
  1. Definition of Customer Services Market 58
  2. Product Coverage 58
  3. Forecast Methodology 59
  4. Software Support 60
  5. Educational Services 61

Exhibits

I

-1 1988 INPUT Research Base 3

II

-1 U.S. Service Market, 1988-1993 6
-2 U.S. Third-Party Maintenance (TPM) Market, 1988-1993 8
-3 IBM Service Announcements, 1988 8
-4 System Availability Trends, 1983-1988 10

III

-1 U.S. Customer Service Market, 1988 12
-2 U.S. Customer Service Market, 1993 15
-3 U.S. Customer Service Market by Product Type, 1987-1993 16
-4 Top Eight Large-System Service Vendors by Market Share 18
-5 Top Ten Small-System Service Vendors by Market Share 19
-6 U.S. TPM Market by Product Type, 1987-1993 22
-7 Top Ten TPMs by Market Share 24
-8 Fourth-Party Maintenance Market by Service Delivered, 1987-1993 27

IV

-1 Revenue Breakdown of Typical Manufacturer-based Service Organization 30
-2 Expense Breakdown of Typical Manufacturer-based Service Organization 31
-3 Revenue Breakdown of Typical TPM Organization 33
-4 Expense Breakdown of Typical TPM Organization 34
-5 Service Productivity—Manufacturer versus TPM 36
-6 Service Productivity of Selected Service Organizations 37
-7 Large-Systems System Availability, 1983-1988 38
-8 Small-Systems System Availability, 1983-1988 39
-9 Large-System User Satisfaction with High-Priority Services 40
-10 Small-System User Satisfaction with High-Priority Services 41

Exhibits (Continued)

IV

-11 Major TPM/Manufacturer Litigations 45
-12 1988: The Service Year in Review (January-March) 46
-13 1988: The Service Year in Review (April-June) 47
-14 1988: The Service Year in Review (July-September) 48
-15 1988: The Service Year in Review (November-December) 49

V

-1 Effect of Pricing Changes on Service Market 51
-2 Key Service Objectives 52
-3 Hardware Product Managers—Focus Items 53
-4 Software Product Managers—Focus Items 53
-5 Service Business Managers—Focus Items 54
-6 TPM Service Environment 55
-7 TPM Service Managers—Focus Items 55
-8 Professional Service Market Forecast, 1987-1993 57
-9 Software Product and Support Market Forecast, 1987-1993 61

I

Introduction

I

Introduction

The following report, *U.S. Customer Service Market Analysis*, is the last deliverable for clients of INPUT's 1988 Customer Service Program. The report provides a current market size and five-year forecast for the U.S. customer service market, broken down into the three major product categories: large systems, small systems, and microcomputers/workstations. In addition, the report presents the current market size and forecast for third-party maintenance. Also, the report analyzes service issues and trends that will affect both short-term and long-term service revenue growth.

A

Scope

The purpose of this report is to size the current market for customer services in the U.S., as well as provide growth expectations over a five-year forecast period. The report breaks down the U.S. customer services market into two major service sources—manufacturer-supplied service and third-party maintenance (TPM) service. The report further breaks down each service submarket into product groupings: large systems (comprising of supercomputers, mainframes, and minisupercomputers), small systems (comprising of superminicomputers and traditional minicomputers), microcomputers/workstations (comprising of business-use microcomputers, supermicrocomputers, and workstations), and peripherals (disk drives, tape drives, printers, and terminals).

Following this introduction, an Executive Overview (Chapter II) provides the main points of this report. Each main point is presented in exhibit format, with accompanying text.

Chapter III presents the actual market size and five-year forecast information for the total U.S. service market, as well as breakdowns for the large-systems market, small-systems market, microcomputer/workstation market, and peripherals market. A separate analysis of the third-party maintenance (TPM) market follows, broken down into types of products serviced. A ranking of the top large-systems service vendors, small-

systems service vendors, and TPM vendors (by market share) is also provided in this chapter.

Chapter IV examines issues and trends that have affected, or will affect, service delivery and growth. Important service issues such as pricing trends, manufacturer versus TPM competition, revenue and expense trends, contract changes, and evolving user requirements for service are explored. A useful reporting of the past year's customer service highlights concludes the chapter.

Chapter V concludes the report with management focus items to improve service delivery and uncover future growth markets. Appendices at the end of the report provide examples of the questionnaires used during the past year as well as a glossary of terms used in this report.

B

Methodology

This report was prepared as the culmination of INPUT's 1988 Customer Services Program research activities. During the past year, INPUT surveyed almost 1,000 users of computer equipment (broken down by product in Exhibit I-1), measuring satisfaction with service as well as attitudes about and requirements for alternative services, including third-party maintenance. (The results of this research are presented in the following INPUT reports: *Analysis of Large-System Service, Analysis of Small-System Service,* and *Analysis of Third-Party Maintenance.*) In addition, INPUT surveyed 117 leading vendors of customer services regarding their current service operations, including revenue performance, employee totals, and services provided. (These surveys resulted in service vendor profiles found in *Service Vendor Analysis—Large Systems, Service Vendor Analysis—Small Systems,* and *Service Vendor Analysis—Third-Party Maintenance.*)

This extensive primary research effort has provided INPUT with great insight into the customer services market. In addition, INPUT tracks literally hundreds of manufacturer-based and third-party maintenance organizations, collecting information such as annual reports, Form 10Ks, press releases, marketing literature, and news articles from leading service journals. This information is contained in vendor files in INPUT's Information Center and is used, where necessary, to supplement primary research performed in the past year.

The vendor research resulted in a revenue pool that represents 85% of the U.S. manufacturer-supplied service and 90% of the TPM service markets for the 1987 base year. Interview results, as well as quarterly revenue information, allowed INPUT to forecast 1988 market information. INPUT used this information, as well as historical data held in INPUT's Information Center, to forecast future service growth expectations presented in this study.

For further discussion of INPUT's forecast methodology, see Chapter III.

EXHIBIT I-1

1988 INPUT RESEARCH BASE

User Research	No. of Surveys
Large-System Users	381
Small-System Users	399
TPM Users	200
Total Users	980

Vendor Research	No. of Surveys
Large-System Vendors	6
Small-System Vendors	11
TPM Vendors	100
Total Vendors	117

II

Executive Overview

II

Executive Overview

This chapter contains summary information and key findings from the report, *U.S. Customer Service Market Analysis*. Each finding is presented in an exhibit with accompanying text.

The U.S. customer service market is undergoing a period of reduced growth expectations, as a result of improved product reliability, increased competition between manufacturers and third-party maintenance organizations, and continuing pressure from users to reduce service prices. These factors have moved service organizations to improve service efficiency (one such way commonly used is increased automation of service) and, more importantly, to investigate new avenues for service revenue growth. The purpose of this study is analyze growth opportunities available to manufacturer and TPM service organizations.

A

U.S. Service Market: 1988-1993

This report presents U.S. customer service growth expectations that are markedly lower than previous INPUT service market forecasts. As recently as the 1987 INPUT study, *Service Market Analysis, Large and Small Systems,* INPUT was forecasting total service revenue growth expectations of 11% per year from 1987 to 1992.

These forecasts did not foresee the continued slump in U.S. service revenues endured by many major manufacturer-based service organizations, most notably industry-leading IBM, which saw 1987 U.S. maintenance revenues drop from $4.0 billion (1986) to $3.6 billion. Moreover, the slump continued (and worsened for many vendors, particularly in the third-party maintenance market) in 1988, and INPUT expects that IBM's service revenues for 1988 should fall to $3.2 billion.

Exhibit II-1 presents INPUT's most up-to-date sizing of the U.S. customer services market (combining manufacturer and TPM service). Note that overall market growth is expected to be only 6% per year over the next five years. Large systems service, which was once the primary service market (and also of which IBM holds a majority of service revenues), will grow only 4% per year over the forecast period, merely half as fast as forecasted in 1987.

EXHIBIT II-1

U.S. SERVICE MARKET
1988-1993

Product	User Expenditures 1988 ($B)	1993 ($B)	1988-93 CAGR (Percent)
Large Systems	1.2	1.4	4
Small Systems	3.6	5.1	7
Micro/Workstations	1.1	1.7	10
Peripherals	6.6	8.9	6
Total	12.6	17.1	6

The main reasons for this reduced expectation for service growth are the following:

- Increased competition between service providers. This has resulted in service price reductions and expansive service discount programs, best typified IBM's Corporate Service Amendment (CSA) and Mid-Range Systems Amendment (MRSA) programs of 1987. Even with fairly restrictive qualification requirements (i.e. "help desk", Self-Initialization Review), user acceptance of these programs was exceedingly high (somewhere in the 80% range).

- Increased reliability of systems. Users are demanding lower service prices that reflect the reduced need for service. (This also contributed to the higher than expected acceptance of the increased user participation requirement of CSA/MRSA and similar discount schemes.)

B

U.S. Third-Party Maintenance Market, 1988-1993

Perhaps to a greater extent, 1988 was a particularly tough year for most third-party maintenance (TPM) organizations, which saw their market growth abruptly slow to a standstill. Again, just as INPUT market growth projections were reduced significantly for the overall U.S. customer service market, the forecasts for third-party maintenance show reduced growth expectations that have declined significantly for the past three years.

In 1986, the TPM market enjoyed what now appears to be the peak of its successful growth pattern. User acceptance of TPM as viable service alternatives increased as larger TPMs expanded their businesses through acquisition and developed service delivery systems and programs that competed with their manufacturer-based counterparts. In 1986, INPUT forecasted 18% per year growth expectations over the five-year forecast period.

By 1987, TPM growth had begun to slow. First, manufacturers such as IBM and DEC impacted TPM penetration by expanding warranty lengths. Intended primarily to benefit users, these moves also had a detrimental effect on TPMs' ability to compete on newer products. Manufacturers also began to respond to the increased penetration by TPMs into their user bases by offering significant discount programs (best typified by IBM's CSA and MRSA). TPMs responded with their own policies, but without the ability to spread the lost revenues over other parts of their business, their growth suffered. Reflecting this, INPUT's 1987 five-year TPM growth projections fell to 12% per year.

Now in 1988, increased price competition from manufacturers, user acceptance of CSA-like policies from manufacturers, and increased involvement in multivendor service by virtually all manufacturers (including holdouts IBM, DG and HP), requires INPUT to further reduce TPM growth prospects. Exhibit II-2 shows that TPM five-year growth is expected to be only 6% per year through 1993. Most of the major TPM companies reported little, if any, growth over last year, and even acquisition activity, often used as a bellwether of market growth expectations, was down significantly in 1988.

C

IBM Continues Aggressive Service Policy Changes

Last year proved to be a critical year for customer service at IBM. "Big Blue" announced a number of service policy changes that demonstrated a renewed aggressiveness to slow loss of service business to TPM penetration. While much attention was focused in 1987 on the sweeping discounts offered by CSA and MRSA service options, IBM also made a number of other significant service moves, including expanding all system service coverage to 24-hour by 7-day per week (24/7), eliminating non-prime time-and-materials (T&M) service (which impacted brokers and small TPMs that relied on IBM T&M availability to support off-hour customer needs), and tightened the spare parts pipeline by reducing the number of Spare Part Centers.

EXHIBIT II-2

U.S. THIRD-PARTY MAINTENANCE MARKET, 1988-1993

Product	User Expenditures		
	1988 ($M)	1993 ($M)	1988-93 CAGR (Percent)
Large Systems	100	110	2
Small Systems	370	490	6
Micro/Workstations	580	850	8
Peripherals	530	640	4
Telecom	150	220	8
Total	1730	2310	6

In 1988, IBM continued to make dramatic service policy announcements that expanded its service offerings while continuing to make IBM service more affordable, as summarized in Exhibit II-3. The Extended Maintenance Option (EMO) offered guaranteed 11% to 26% discounts on selected IBM machine types for three-, four-, and five-year lengths. The EMO discounts can be combined with CSA/MRSA discounts, provided the lengths of terms are identical.

EXHIBIT II-3

IBM SERVICE ANNOUNCEMENTS 1988

- EMO Prepayment Discounts 11% to 26%
- COS Site Management Services
- TSM Mixed-Vendor Support
- Telecommunications Services, Network Support
- AS/400 Electronic Customer Support

The AS/400 small system announcement included lower service prices coupled with an advanced remote support capability, called Electronic Customer Support, that provides improved remote diagnostics, access to technical information via IBM-Link, the ability to create and access local and remote data bases, and resource and configuration management services.

IBM expanded its service offering with the Custom Operational Services (COS) site planning service. But more importantly, IBM expanded its multivendor support capabilities with Technical Services Management (TSM), which offers three levels of mixed-vendor support where IBM can contract the service out or act as the primary servicer. IBM's Telecommunications Services, Network Support offering provides TSM-like multivendor support coordination, along with remote network management assistance and advanced network monitoring and diagnostic tools.

D

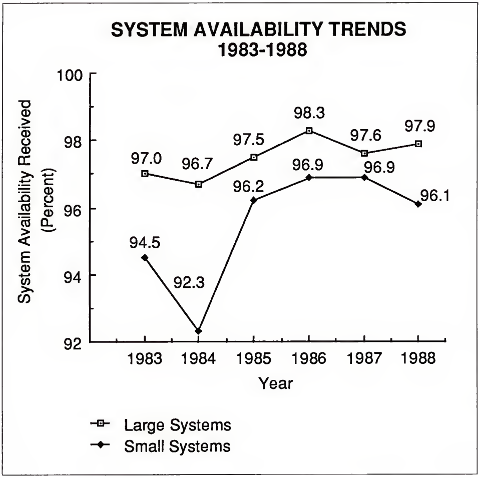
System Availability Trends, 1983-1988

System availability is of primary importance to users of information processing systems. INPUT has tracked vendor performance in this area since 1983. In 1988, INPUT surveyed 980 users of large and small systems regarding the service and support that they received from their vendor, including their satisfaction with system availability. System availability requirements for large systems leveled off at 98.3% in 1988, while small-system availability requirements actually dropped from 97.9% in 1987 to 96.9% in 1988.

Exhibit II-4 presents large- and small-system vendor system availability performance for the past five years. In the large systems market, users reported that the system availability that they received improved slightly, from 97.6% in 1987 to 97.9% in 1988. (Of course, improvements at this level of system availability are much harder to achieve, since on-site response times and repair times have approached optimum levels, and any further improvement will require significant increase and improvement in the use of remote support delivery.) In 1987, the drop in system availability could have been attributed to the increased user participation in support called for in CSA contracts, while the improvement in 1988 may reflect increased user experience in performing system management and diagnosis.

On the other hand, the drop in system availability reported by small-system users in 1988 may reflect similar problems of assuming the increased user self-maintenance responsibility called for by MRSA contracts that the large system users went through in 1987 (IBM announced MRSA later in 1987, while CSA came out actually in late-1986). Presumably, small-system system availability will also improve in 1989 when small-system users adjust to the "help desk" responsibilities of MRSA. (Incidentally, the severe dip in 1984 resulted from the inclusion of older products from Datapoint and Burroughs in the small-system sample.)

EXHIBIT II-4


SYSTEM AVAILABILITY TRENDS
1983-1988
System Availability Received (Percent)
100
98
96
94
92
Year
1983
1984
1985
1986
1987
1988
Large Systems: 97.0, 96.7, 97.5, 98.3, 97.6, 97.9
Small Systems: 94.5, 92.3, 96.2, 96.9, 96.9, 96.1
Large Systems
Small Systems

III

Current Service Market Size and Forecast, 1988-1993

III

Current Service Market Size and Forecast, 1988-1993

A

Research Forecast Methodology

In 1988, INPUT amassed vendor revenue information on leading manufacturer-based and third-party maintenance organizations. This information was ascertained by the following methods: direct survey, annual reports and Form 10Ks received from the vendor (and stored in INPUT's Information Center located at the Mountain View, CA headquarters), and various other sources. When necessary, INPUT made estimates of privately held service organizations that declined to reveal their service revenues. In order to focus the forecast on the U.S. service market, revenue information was broken down into U.S. service only.

This information became the basis for the 1987 service market, provided in each forecast as a base year of reported service revenue. The 1988 information, which acts the starting point of traditional INPUT five-year forecast, was derived from interpretation of public company quarterly reports, Form 10Qs, as well a survey information regarding growth expectations from responding companies.

INPUT has created proprietary forecast model that looks at past service revenue growth trends as affected by product, service delivery, pricing, and user trends. In addition, assumptions regarding future product population growth and releases, technological trends, pricing trends, and other factors are made and applied to growth rates.

The resulting forecast for U.S. customer service is the broken down by product serviced (large system, small system, microcomputer/workstation, or peripheral). First, companies that address a single product market are automatically placed in that service market. Those companies that address more than one product market are broken down via a proprietary model that builds a "typical" system configuration, calculates configured system annual maintenance charges (with any appropriate service discount), and applies that system maintenance charge to the estimated installed number of that system to derive the total service revenue contribution for that product. Each product's service revenue contribution is

computed in this fashion, making it possible to estimate the breakdown for each company. This model also breaks out processor versus peripheral service revenue, allowing separate forecasts for each.

Total third-party maintenance revenues are forecasted using TPM vendor revenue information estimated in the same manner discussed above. Product breakdowns are estimated from user research reflecting use of and willingness to use TPM, as well as assumptions based upon anticipated manufacturer service pricing and policy changes.

B

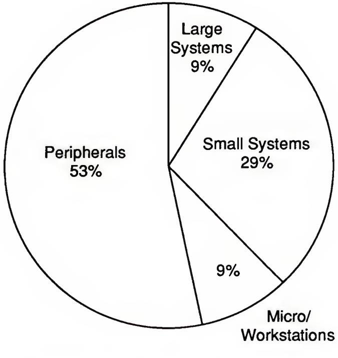
U.S. Customer Service Market

1. Current Market

INPUT estimates that the 1988 customer service market will be $12.6 billion, up 8% over the 1987 base year. Exhibit III-1 breaks down this service market by the following product types: large systems (CPU only), small systems (CPU only), micro/workstations, and peripherals (excluding microcomputer and workstation peripherals, which are included in the micro/workstation segment).

EXHIBIT III-1

U.S. CUSTOMER SERVICE MARKET, 1988



1988 U.S. Total Service Market: $12.6 B

The large-systems (CPU) segment comprises traditional mainframes, minisupercomputers, and supercomputers that have typical word lengths of 32 bits and configuration prices in excess of $350,000. Example of such systems included IBM 303X, 308X, and 309X and computer systems that compete with these products, including systems from NAS, Amdahl, NCR, Unisys, CDC, and Honeywell Bull. A smaller segment of this market is held by supercomputer manufacturers (typical configuration prices exceeding $1 million), led by Cray Research. Even smaller shares are held by the new minisupercomputer segment (typical prices between $300 and $400 thousand); manufacturers in this segment are led by Floating Point Systems.

Historically the large-systems service market historically was the largest, due to the fact that it is both the oldest and the costliest (in terms of system purchase price). A number of factors have reduced the relative size of this service market, including: competition-caused price reductions (i.e. IBM's Corporate Service Amendment, that effectively reduces CPU maintenance to less than 1.5% of purchase price) that have reduced large-systems revenue contribution; rumors of new products, such as the much-discussed IBM Summit family, that have slowed new product sales and caused users instead to "bulk up" their existing systems by adding memory; and increasingly powerful smaller systems, which provide the same power and speed (typically measured in MIPs) as older larger systems at greatly reduced size and cost.

As a result, small-systems service constitutes an increasingly important service market, both for manufacturers and for TPMs, who are focusing on small systems as a growth market. Small systems can be categorized as superminicomputers and more traditional business minicomputers that, due to steadily improving design and technology, have outgrown traditional definitions (which defined small systems as providing 16-bit to 32-bit word lengths at prices ranging from $15 to $350 thousand. Increasingly, microcomputers and workstations meet the 32-bit definition, and many cross over the $15 thousand lower price limit). Typical small systems include IBM System 3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime, Concurrent, Gould, Unisys, NCR, Honeywell Bull, Harris, Tandem, Stratus, and many others.

Again, the rapid increase in power and size/price advantages of these systems have made them increasingly attractive to users. Furthermore, systems designed to facilitate "departmental" applications are even more popular, as companies look for ways to improve end-user information processing efficiency in such a manner that frees the users from the traditional Information Systems control. Improved networking facilities, that further increase small system power by allowing systems to access and communicate with other systems, will contribute to growth in this

market as well as create demand for new services, such as network planning and management.

Technological advances have also contributed to the microcomputer/ workstation market segment, which now comprises 9% of the total service market. This segment contains business use microcomputers, supermicrocomputers, and technical workstations that traditionally are defined as 16 to 32-bit word lengths (again, advances have stretched these boundaries) and system prices that typically fall below $15 thousand. Leading products the traditional microcomputer segment include IBM's PC family, including the most recent PS/2 line, Apple Macintosh, and systems from Compaq, Tandy, and countless "name" and "no-name" clone manufacturers (manufacturers of products that have a high degree of compatibility with IBM PCs). The most interesting end of this market, the supermicrocomputer and technical workstation markets, are best represented by products from Apollo, Sun, Altos, DEC (the MicroVAX), and, to some extent, IBM (some see the extension of the PS/2 line into this market).

The largest segment of the U.S. customer service market is the peripherals market, which comprises 53% of the total service market. Fed by times of both growth and stagnation in the various processor markets, peripherals maintenance now constitutes 65% of a typical large system configuration and 55% of a typical small system configuration. INPUT's peripheral forecast includes the following types of products: storage, disk drives (and the associated controller), tape drives (and controllers), terminals, printers, power units, and switches.

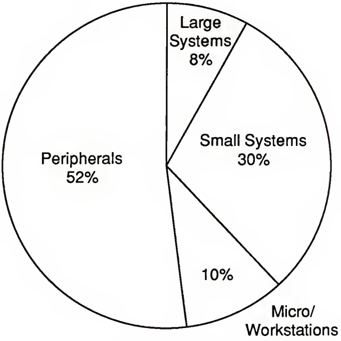
2. Forecasted Market Size

By 1993, the product breakdown of the U.S. customer service market will not have changed dramatically, as shown in Exhibit III-2. Peripherals will continue to contribute the majority of service revenues, still making up 65% and 55% of large and small systems configurations respectively. The only event that might impact peripheral service revenue growth would be acceptance of IBM's three-year warranty length currently found on the 3191 terminals, which was announced early in 1987 and has not yet been matched by other manufacturers.

Small-systems and micro/workstations service will continue to grow faster than the rest of the service market, and each segment will increase its share in the overall service market. Both product markets will benefit from continued product sales growth, as technological advances improve both product performance and serviceability (as currently reflected in IBM's newest small system, the AS/400, which offers excellent price/ performance and advanced remote support facilities).

EXHIBIT III-2

U.S. CUSTOMER SERVICE MARKET, 1993



1993 U.S. Total Service Market: $17.1 B

Large-systems service will lose service market share, as increased reliability, increased competition between fewer competitors, and product sale competition from powerful superminicomputers will continue to reduce large-system service revenue growth.

INPUT's most up-to-date five-year forecast of the U.S customer service market is presented in Exhibit III-3. Previous forecasts presented by INPUT (and most other observers of the service market) have reported much more optimistic growth expectation (i.e. INPUT's 1986 five-year forecast was 12%, and INPUT's 1987 forecast five-year forecast was 11%).

Early in 1988, INPUT began reporting on reduced growth expectations for service that were the result of continued improvements in product design and reliability, which spurred user demand for lower service prices. One response to this increased user demand was IBM's CSA and MRSA service discount offerings (and the corresponding responses from competitive TPM vendors). The impact on service revenues was almost immediate, so much so that when IBM announced its final 1987 U.S company revenues, service revenues had actually declined from $4.0 billion in 1986 to only $3.6 billion in 1987.

EXHIBIT III-3

U.S. CUSTOMER SERVICE MARKET BY PRODUCT TYPE 1987-1993

Product	User Expenditures 1987 ($B)	1988 ($B)	1989 ($B)	1990 ($B)	1991 ($B)	1992 ($B)	1993 ($B)	1988-93 CAGR (Percent)
Large Systems	1.1	1.2	1.2	1.3	1.3	1.4	1.4	4
Small Systems	3.3	3.6	3.9	4.2	4.4	4.7	5.1	7
Micro/Workstations	1.0	1.1	1.2	1.3	1.4	1.6	1.7	10
Peripherals*	6.2	6.6	7.1	7.4	7.8	8.3	8.9	6
Total**	11.7	12.6	13.4	14.1	15.0	16.0	17.1	6

*Excludes Associated Micro/Workstation Peripherals, which are included in Micro/Worksation Forecast
**Numbers do not add up due to rounding

What INPUT, and most others in the service industry, could not foresee was the overwhelming acceptance of CSA and MRSA contracts (now estimated to comprise 80% of all system service contract customers) or the additional discounts to be made available to IBM customers through its Extended Maintenance Option (EMO) released in 1988, which offered further discounts of 11% to 26% for prepayed, multiyear contracts. Essentially, IBM lowered overall cost of ownership, a competitive trend that spread to other manufacturers.

Obviously, increased price competition did not impact IBM alone. Many manufacturer-based and TPM vendors reported slowed or even negative service revenue growth. This slowdown in the industry was reflected by cutbacks in late-1987 by manufacturer service organizations, such as Data General and Honeywell Bull (even IBM offered early retirement and transfers), and more staff cutbacks in 1988 by such major TPMs as Sorbus, Dataserv, and Servcom.

C

Large-System Service Market

In the past, the large-system service market has been relatively insulated from product shipment fluctuations, due to the importance that large-system users place upon system availability and service. This value placed upon service acted to limit user price sensitivity. In addition,

large-system users placed greater value on ancillary services, planning, consulting, etc.

Increased user recognition of growing system availability caused users to question why service prices were not dropping accordingly. In addition, large-system users became aware of alternatives, both in the form of increasingly powerful small systems that offered price- and size-to-performance advantages over older mainframe designs, and alternative service sources from TPMs with growing service capabilities. As a result, competition increased between the traditional large-system manufacturers themselves, between large-system manufacturers and small-system manufacturers, and between manufacturers and TPMs.

The leading player in this marketplace, IBM, made the strongest move in late-1986 by announcing the Corporate Service Amendment (CSA), which offered significant discounts of up to 45% to users who sign multiyear contracts and agree to assume a greater share of the responsibility for service management and diagnosis. Other manufacturers were forced to drop service prices in order to remain competitive (e.g. plug-compatible vendor Amdahl reduced prices by 11-23% on August 1, 1988).

Exhibit III-4 ranks the leading eight vendors of large systems, based upon 1987 large-system service revenue. IBM maintains the leadership position, with 63% of the large-system service market. In 1988, IBM added the EMO prepayment discount plan that can be combined with CSA discounts (provided that the two programs are signed for identical lengths); the EMO plan further ate into large-system and, to a lesser degree, small-system service revenue growth.

Unisys holds the number-two position on the strength of the combined product bases of the Burroughs A-series and older B7900 mainframes, and the Sperry 1100/XX systems. Unisys moved to address user concern over the future of both product lines by announcing that each architecture will be maintained "forever and a day," and by releasing product enhancements for both architectures.

Most of the large-systems attention is placed on the competition between IBM and the two plug-compatible manufacturers, Amdahl and NAS. As stated previously, Amdahl, feeling increased pressure from users as well as from the competition, lowered service prices by 11-23%. These factors may help explain why sales at Amdahl continued to rise 56% in 1987 while service revenues grew only 10%. NAS sales also increased in 1987, yet rumors currently circulate regarding parent National Semiconductor's desire to sell the NAS unit.

EXHIBIT III-4

TOP EIGHT LARGE-SYSTEM* SERVICE VENDORS BY MARKET SHARE

Rank	Company	1987 Revenues ($M)	Market Share (Percent)
1	IBM	1900	63
2	Unisys	410	14
3	CDC	156	6
4	Amdahl	125	4
5	Honeywell Bull	120	4
6	NAS	116	3
7	Cray	100	3
8	NCR	75	2

*Includes Associated Peripheral Service Revenue

Large-system service growth is expected to continue at a 4%-per-year clip between 1988 and 1993. Continued competition, combined with pressure from users to reduce service prices, should continue to limit hardware maintenance service growth. Large-system vendors are already attempting to exploit new service areas, such as multivendor service, network support services, and the like, so it is not likely that large-system vendors will uncover many "new" areas of opportunity. Most will continue to rely on user demand for 100% system availability to counter extreme demands for lower service prices.

D

Small-Systems Service Market

The small-system service market, on the other hand, should continue to grow at a faster clip than the overall service market. Spurred by continuing demand for new products, small-system service should grow at a 7%-per-year pace from 1988 to 1993. Most of that growth will be concentrated at the higher end, among vendors (and products) such as DEC (and the VAX 8XXX line); IBM (with the 9370 and AS/400 families); HP (as its RISC line takes off); and smaller-niche players, such as Concurrent, Tandem, Stratus, and others.

The small-systems market has shown that it is not completely insulated from the market factors that have slowed large-system service growth. Before releasing its most competitive small system in a long time (the AS/400), IBM aggressively attracted small-system service pricing with its Midrange System Amendment discount offering. DEC found it necessary to change its warranty service levels, charging 4-9% more for warranty customers who want anything more than Return-to-DEC warranty service. This move was seen as a way to improve stock analysts' ratings of DEC stock, as slowing sales had caused some concern in the financial community.

Exhibit III-5 ranks small-system vendors by 1987 small-system service revenues.

EXHIBIT III-5

TOP TEN SMALL-SYSTEM* SERVICE VENDORS BY MARKET SHARE

Rank	Company	1987 Revenues ($M)	Market Share** (Percent)
1	DEC	1698	23
2	IBM	1600	21
3	NCR	900	12
4	Unisys	501	7
5	HP	424	6
6	Data General	261	3
7	Wang	255	3
8	Prime	190	3
9	Honeywell Bull	160	2
10	AT&T	150	2

*Includes Associated Peripheral Service Revenue
**Manufacturer-supplied market

Spurred by VAX product sales, particularly newer VAX 8XXX systems first introduced in 1985, Digital Equipment Corporation holds the number-one position in the small-system service market, with a 31% share. DEC attempted to stress its experience in networked system environments, while at the same time expanding its service offerings in these same areas in 1988, by announcing Enterprise-Wide Services, a series of planning, site management, and multivendor support offerings featuring TSM-like strategic alliances with a number of leading service suppliers in a number of technological markets. Also, DEC announced a Network Enterprise Management Program, which focused a wide range of network-related services and established cooperative development relationships with a list of leading telecommunications vendors.

IBM attempted to overcome both DEC and small-system user criticism of IBM's small-system product strategy with the release of its AS/400 family of small systems (the much-discussed "Silverlake" project). The AS/400 offers a number of user benefits, including ease of migration, ease of software development, ease of connectivity, and ease of use. Integral to the ease-of-use benefit is the AS/400 use of advanced remote-support capabilities that improve diagnostics and dispatching while improving the user's ability to receive and store technical support information. Specifically, the AS/400 remote software support provides access to IBM technical information via IBM-Link and allows the user to create and access local and remote data bases that can be later customized by the user. IBM also introduced IBM Telecommunications Services, Network Support offerings that provide problem determination services for IBM and non-IBM networking products.

HP saw worldwide service revenue growth drop from 36% in 1986 to 20% in 1987 (most of which was derived from international operations), so in 1988 HP expanded its Atlanta Customer Support center to centralize dispatching for North America, educational services, system integration services, network support, and depot maintenance services. HP also officially entered the multivendor service market with HP's Multivendor Support Operation (MSO).

Data General saw 1987 sales stay virtually flat over 1986, and service revenues grew by only 6% over the same period. DG attempted to improve profitability (1987 net income was a minus $127 million) by closing three facilities and by laying off 950 employees (including service staff) in 1987.

E

Third-Party Maintenance Service Market

1988 proved to be a critical year for most third-party maintenance companies, which saw the effect of increased efforts by manufacturer-based service organizations, most notably IBM, to recapture customers (and service revenue) lost to TPM penetration.

In the past, TPMs were able to enjoy relatively minor resistance in competing for service of peripherals (particularly those supplied by a different manufacturer from the manufacturer supplying the CPU); microcomputers (whose manufacturers often did not have a service presence); and older, obsolete equipment (whose manufacturers did not want to do service or did not even exist anymore). As the TPM industry developed, TPM vendors attempted to attract users of newer equipment, particularly systems that in the past stayed predominantly with the manufacturer's service organization. In order to be successful at this, TPMs often relied on extremely low service prices (usually 25-33% off manufacturer service prices) as a lure. At the same time, TPMs continued to use small-ticket product service (e.g., microcomputers and peripherals) as a way of getting a foot in the door and later drawing away larger-product service. By 1987, the TPM market had grown to $1.7 billion.

Also in late-1986 and 1987, IBM made a number of service pricing and policy announcements that would severely hamper TPM penetration into IBM's user base. The most significant of these announcements were the elimination of non-prime (outside of Monday-Friday, 8AM-5PM) time-and-material service; expansion of contract service coverage for all systems to 24-hour, 7-day; tightening of the spares pipeline; and, most importantly, expansive service discounting programs (CSA and MRSA) that brought IBM service pricing in line with, or even lower than, the prices of most TPMs.

TPM service organizations that competed directly with IBM for systems service were forced to offer similar service plans. CDC, TRW, Intelogic Trace, and Sorbus all offered multiyear service discount plans that often removed many of the customer involvement requirements, such as the help desk or the initialization review and fees.

In 1988, IBM kept pressure on TPMs by offering prepayment discounts (EMO) and IBM's own multivendor service program, called Technical Services Management (TSM). Other vendors offered new multivendor support offerings (HP and DG) or expanded earlier offerings (DEC).

As a result, TPM service revenue growth expectations have been significantly reduced. Exhibit III-6 shows that TPM growth over the next five years is expected to be only 6%, down from last year's forecast, which projected overall TPM growth of 12% over the 1987-1992 forecast period.

EXHIBIT III-6

U.S. TPM MARKET BY PRODUCT TYPE 1987-1993

Product	User Expenditures							1988-93 CAGR (Percent)
	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	
Large Systems	100	100	100	110	110	110	110	2
Small Systems	350	370	390	400	430	450	490	6
Micro/Workstations	540	580	630	680	740	820	850	8
Peripherals	510	530	550	570	590	610	640	4
Telecom	150	150	160	170	180	190	220	8
Total	1650	1730	1830	1930	2050	2180	2310	6

Breaking down the TPM market by product types demonstrates the effect that IBM's CSA and MRSA service policies have had on TPM growth prospects. In the large-system service market, TPMs have found it difficult to supplant the manufacturer's service offering, since large-system users are less price sensitive and are more apt to require nonhardware maintenance services that TPMs typically do not provide. In addition, user concern over spare parts availability, and access to remote diagnostics and support tools, is greater in the large-systems market, given the high system availability requirements expressed by large-system users. Accordingly, TPM efforts to expand into this market have been limited to either the largest TPMs or small TPMs with focused (product or geographic location) service offerings.

On the other hand, TPMs have been extremely attracted to the product growth prospects of the small-system service market. TPMs have been particularly interested in the IBM System/3X and DEC VAX product bases, as indicated by service offerings by CDC, Unisys, TRW (all for DEC service business), and Intelogic Trace (for IBM System/3X service business). Unfortunately, competition between those two manufacturers and between the manufacturers and TPMs has heated up (re: MRSA); as a result, TPM growth prospects in the small-systems service market have also dimmed.

In order to compete successfully, TPMs will need to follow small-system manufacturers' lead by expanding their support capabilities in the areas of network planning and management.

Microcomputer service and support has been a traditional strength of TPM, since many early manufacturers of microcomputers (Apple, Commodore, Zenith, Compaq, etc.) did not have a direct service force, leaving the direct service to retailers and TPMs. Even IBM found that the majority of its early PC users relied on dealer or TPM support over IBM's own service offerings.

Since most micro manufacturers still do not provide direct service to their users, TPMs should continue to derive most of their service revenues from micro service. However, TPM penetration into the micro service market will be limited in the IBM PS/2 line, where IBM has competitively priced its on-site support offering.

TPMs have shown mixed success at penetrating the upper end of the micro market. TRW was the primary source of support for Altos systems, but now Altos is attempting to spread direct support between its VAR network and those of two other TPMs, Triad and Bunker Ramo. Other supermicro and workstations manufacturers split service between VARs and, increasingly, their own developing service organizations. As of yet, TPMs have not been particularly successful at penetrating the Apollo, Sun, or MicroVAX user bases.

Peripheral service is the other traditional market strength for TPMs, since most system manufacturers did not originally offer service on "foreign" peripherals, thus creating a large pool of available product service. The strategic value of peripheral service became increasingly important to TPMs, which viewed peripheral service as a way of "getting a foot in the door" at large installations, with hopes of attracting larger-system service from users who wanted a single source of support. Thus, TPMs were extremely competitive with regard to peripheral service pricing.

TPM growth in peripheral support has been hit with a few stumbling blocks. First, manufacturer discounting, particularly the CSA and MRSA programs from IBM, carries down to include peripheral products, thus reducing or eliminating any price advantage for going with TPMs. Second, and perhaps more importantly, virtually all major manufacturers provide multivendor support, either directly or as a site management responsibility. Thus, the lure of single-source support has diminished as a purchase-decision criterion for service customers (as shown in INPUT's earlier report on TPM user service requirements, *Analysis of Third-Party Maintenance*).

The last TPM market examined in the 1988 forecast was the telecommunications market segment, composed of modems, multiplexors, LANs,

switches, and front-end processors. TPMs have been successful at securing service business on small-ticket items such as modems. TPMs are becoming increasingly attracted to the idea of addressing the growing network support needs of large- and small-system users; however, TPM growth in this market is being slowed by three factors: technological limitations regarding diagnostics and other support tools, shortages of skilled telecom support personnel, and increased competition from manufacturers who are also attempting to address the same market (this competition tends to aggrevate the shortage of skilled personnel). A final stumbling block may be the user community itself—INPUT research (detailed in the report cited above) shows that current users of TPM report little interest in having their TPM provide network management services.

Exhibit III-7 ranks the top ten third-party maintenance vendors by their 1987 revenues.

EXHIBIT III-7

TOP TEN TPMs BY MARKET SHARE

Rank	Company	1987 Revenues ($M)	Market Share (Percent)
1	TRW	255	15
2	Sorbus	220	13
3	GE	198	12
4	Intelogic Trace	134	8
5	CDC	100	6
6	IDEA Servcom	79	5
7	Decision Data	70	4
8	Dataserv	67	4
9	Unisys	45	3
10	Grumman	40	2

TRW ranks as the largest provider of TPM, with an estimated $255 million in 1987 TPM service revenue. TPM growth at TRW was minimal, however, as TRW spent much of the year centralizing its dispatching and logistics functions (with DATA Group's FieldWatch service management system) and resigning service management contracts with OEMs. TRW made one acquisition in 1988, picking up 3M's TPM business, a four-year-old service organization that concentrated on microcomputers and related service. At one point in the year, TRW had to respond to rumors that it was an acquisition candidate itself (rumored buyers were Sorbus and GM's EDS subsidiary).

Sorbus sold the MAI small-system service business back to the company that once owned it—Management Assistance, Inc.—in 1988. It was reported that MAI equipment service accounted for 25% of Sorbus' TPM business. The MAI service sell-back provided cash to continue an aggressive acquisition year for parent company Bell Atlantic, which added fourth-party specialists DynService Network and CPX to its growing stable of depot repair specialists (Camex and Electronic Service Specialists). At the same time, Sorbus announced two layoffs, totaling 700 to 750 people

After rumors circulated that GE Computer Services was also being eyed by EDS, GECS confirmed that parent organization GE had engaged the services of Kidder, Peabody & Company to actively broker GECS. Still, GECS moved to consolidate its service position with the mid-1987 installation of a $5 million service management system.

Service revenues for Intelogic Trace (IT) were essentially flat in fiscal year (July 30) 1988, reversing a two-year trend of declining revenues, due to faster-than-expected decay of captive Datapoint equipment and less-than-expected success at capturing new service business. IT made a determined push into the IBM System/3X market by matching IBM's "around-the-clock" contract coverage as well as introducing guaranteed response and repair times.

CDC TPM revenues growth also stayed essentially flat in 1987, so CDC took steps to expand product coverage to include DEC VAX 8XXX small systems and IBM 3090 large systems, as well as new professional services, such as the Total Operating Performance Package (TOPP) operating system maintenance planning and installation services.

Two major acquisitions occurred in 1988. IDEAssociates, Inc. purchased Servcom (along with XTRA Business Systems and Courier) from Alcatel, Netherlands in November. Later in 1988, IDEA Servcom announced a layoff of 300 people, at least some of which can be attributed to the consolidation of Courier and Servcom functions and responsibilities.

Earlier in the year, the equipment sale and maintenance (including the TPM) activities of Decision Industries and Momentum Technologies were merged to form Decision Data, Incorporated, making it a major TPM player.

F

Fourth-Party Maintenance Market

A fast-growing outgrowth of the third-party maintenance market is the fourth-party maintenance (FPM) market (called "fourth-party" because the end user is usually not the customer, but is some other servicing agent). Since FPM services are almost always performed at a service center or depot, FPM is sometimes referred to as independent depot repair.

Typical services offered by FPM organizations include product refurbishment (which includes cleaning and cosmetic changes), product refeaturing (product upgrades/downgrades and memory expansion), and reconditioning (typically subassembly repair and remanufacturing). Since sealed disk drives are a common product serviced by FPM, most major FPM operations require a class-100 clean-room environment, since dust contamination can destroy disk drives.

FPM offers many benefits to service organizations. Using FPMs to remanufacture components frees manufacturers from having to send components back through their own manufacturing facilities, resulting in faster returns and minimal interruption of normal manufacturing cycles (extremely beneficial since a manufacturer's primary goal is to produce new products, not remanufacture existing products).

TPMs without remanufacturing capabilities can utilize FPM to expand their service offerings to include product refurbishment, refeaturing, and reconditioning services without the labor or material (parts, equipment, clean room) requirements.

Many manufacturers and TPMs with manufacturing capabilities recognized the benefits of providing FPM services. From the above discussion of the benefits of using FPM, it is apparent that there is a large and growing requirement for such services, particularly as new-part replacement costs encourage many servicing agents to look for new sources of spare parts (or, in the case of FPM, refurbished parts). Also, many manufacturers realize that adding FPM services could help them optimize manufacturing line productivity.

Exhibit III-8 provides the forecast of the FPM market, segmented by the type of activity performed. Note that the highest-volume service, product refurbishment, also offers lowest growth potential due to the relatively low margin involved. On the other hand, refeaturing and reconditioning services carry higher material and labor costs, yet the user requirement for such services, coupled with a limited (as of yet) supply of

these services, has allowed FPM vendors to price their service at levels that provide sufficient margin to support such optimistic growth projections.

EXHIBIT III-8

FOURTH-PARTY MAINTENANCE MARKET BY SERVICE DELIVERED 1987-1993

Service	Revenues 1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1988-1993 CAGR (Percent)
Refurbishment	40	40	50	60	70	90	90	17
Refeaturing	10	10	20	20	30	40	50	29
Reconditioning	110	160	170	230	270	320	370	19
Total	160	210	240	310	370	450	510	21

Currently, INPUT can identify only 25 FPM specialists in the U.S. market. Most of these companies range from $2 to $5 million in FPM revenue, with anywhere between 5 to 50 FPM technicians. In addition, many traditional TPMs (and even some manufacturers, such as Texas Instruments), are offering FPM service. Bell Atlantic Corporation, parent company of Sorbus, has acquired a number of FPM firms—including Camex, CPX, Electronic Service Specialists (ESS), and DynService Network—and must now be seen as the leading provider of FPM. Other major TPMs with significant FPM business include TRW (through its Electronic Services Division) and GE Computer Services (through its Electronics Services business group).

IV

Customer Service Market Issues

IV

Customer Service Market Issues

A

Service Business Operations Analysis

As future service revenue projections demonstrate slowed growth prospects, service organizations will need to keep a closer eye on the business aspects of service. Major emphasis will be placed on maximizing productivity, in terms of controlling labor and material costs and in terms of understanding and exploiting revenue sources.

1. Manufacturer-based Service Organizations

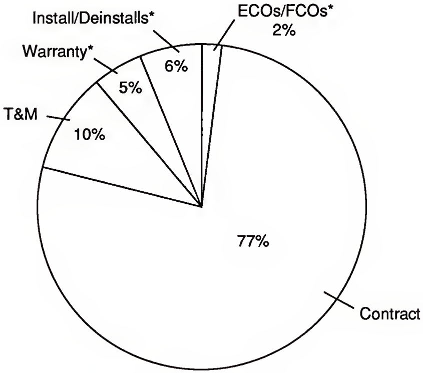
Exhibit IV-1 presents the revenue source breakdown of a typical manufacturer-based service organization. Not surprisingly, contract services contribute the lion's share of service revenues for manufacturer service organizations. Large-systems manufacturer-based service organizations derive an even greater share (85%) of their revenues from contract services, as better than nine out of ten large-system users purchase service contracts. When time-and-material (T&M) service is performed by large-system service, it is typically performed on peripherals and other equipment located at a user site.

Time-and-material service is more predominant among smaller system and peripheral manufacturer-based service organizations, since contract hit rates (service contract purchase rates) are lower in these markets. In addition, smaller system contract service coverages, with the exception of those from a few vendors (i.e., IBM), do not provide around-the-clock coverage; therefore, there is a greater percentage of T&M business performed for contract holders who require service performed outside of their contracted hours of coverage.

Warranty service (5% of revenues), installation/deinstallation (6%), and engineering change orders/field change orders (ECOs/FCOs) are usually delivered in the form of credits or internal transfers from other organizations within the company (usually sales).

EXHIBIT IV-1

REVENUE BREAKDOWN OF TYPICAL MANUFACTURER-BASED SERVICE ORGANIZATION
(By Source)



*Usually in Form of Revenue Credits to Field Service Organization

In the future, revenue contribution from contract services should increase at the expense of T&M service. Contract coverages are increasing, reducing the need for T&M service to support contract customers who require service during hours outside the contract's window of coverage. In addition, contract prices have dropped (and will continue to drop) to a point that encourages more users to purchase contracts, particularly in the smaller-system markets (for example, IBM PS/2 service pricing has significantly increased its microcomputer service hit rate).

If warranty lengths continue to increase, then warranty contribution to service revenue should also increase.

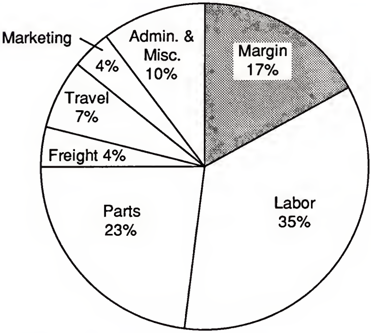
The other side of the coin, service expenses, is examined in Exhibit IV-2, which provides a breakdown of service costs by expense item as a percentage of total revenue. Labor costs (both direct and indirect labor, including salaries, benefits, incentives, and associated overhead) consti-

tute the largest draw of revenues. Labor costs have been steadily declining as modular product design, remote diagnostics and implementation capabilities, improved support tools and training, and improved manufacturing processes have resulted in more-reliable products that require less on-site service time by service personnel.

EXHIBIT IV-2

EXPENSE BREAKDOWN OF TYPICAL MANUFACTURER-BASED SERVICE ORGANIZATION

(By Expense Item as a Percent of Revenues)



Partially as a result (product performance advances have also contributed), material costs (most often in the form of spare parts) have increased as labor costs have decreased. The costs of individual spare parts have risen to such a point that most major service organizations must centralize spares where possible and utilize overnight express firms to deliver these parts to the user site. As a result, freight expenses have increased to represent 4% of revenues.

One would assume that a reduced need for on-site service intervention would have significantly reduced travel costs; however, most service organizations have increased the machines-to-FE ratios, which increases the distances (and amount of time) that FEs spend on the road. In addition, many service organizations have attempted to maintain personal contact with customers by having FEs and other support personnel schedule visits to customer sites.

Marketing costs have become an increasingly visible expense as competition between service vendors has expanded to the advertising area. Most major service organizations have utilized advertising in general-business and even popular print medias, and IBM has even advertised its service capabilities on network television advertising. In addition, almost all major service organizations have developed dedicated sales organizations, including the innovative use of telemarketing.

In the future, labor costs should continue to decline as manufacturers continue to incorporate advanced automated service delivery functionality (including artificial-intelligence-based tools) into the systems themselves. Parts costs will rise at an even faster rate and will eat into service margins. (At a 1987 presentation to the consulting community, one DEC service official predicted that material costs will exceed labor costs at DEC by 1990.)

Travel costs should decline, as most service organizations effectively replace on-site intervention of system failures and rely almost exclusively on remote support. At the same time, freight costs will increase, as parts costs rise to the point that almost all parts are stored at centralized parts centers.

2. Third-Party Maintenance Service Organizations

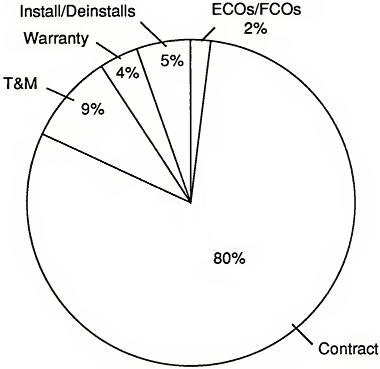
Exhibit IV-3 presents the revenue breakdown of a typical third-party maintenance organization (TPM). Greater emphasis is placed upon contract services, since maintenance is the sole product of the company and because contracts provide a constant source of revenue. Also, TPM price contract prices had to be lower than the manufacturer's (in the past, 25-33% discounts were typical).

When TPMs sign maintenance agreements with OEMs or VARs, one component that has to be worked out is how the TPM recovers costs incurred while providing service for warranty work, installation services, and ECOs/FCOs. For warranties that stipulate on-site support, TPMs may charge the OEM or VAR per visit or may calculate an overall charge based on expected response calls. Some manufacturers have negotiated warranty work compensation that comes in the form of discount or credit against spare parts sales to the TPM.

Installation charges may be recovered from the OEM or VARs (who may choose to provide the installation as part of the product purchases agreement), but more often TPMs bill the end user separately for installation services. ECOs/FCOs, on the other hand, are always billed to the OEM or VAR, usually on an as-performed basis.

EXHIBIT IV-3

REVENUE BREAKDOWN OF TYPICAL TPM SERVICE ORGANIZATION
(By Source)

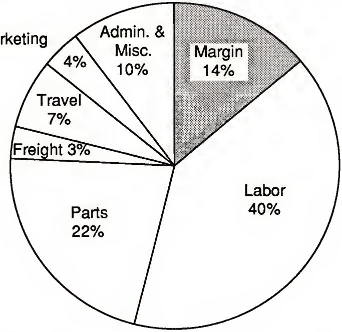


In the future, the only significant change in revenue sources may be an increase in T&M services, particularly if other manufacturers follow IBM's lead and restrict or eliminate non-prime shift T&M service. When IBM eliminated non-prime-shift T&M service in 1987, self-servicing IBM users and, more significantly, smaller TPMs and equipment brokers lost an important fallback source of off-hours service. Major TPMs stepped in to provide the service, even though brokers found the loss of "actual IBM" service detrimental to their sales pitches. If more manufacturers follow IBM's lead, large TPMs with name recognition should benefit.

Exhibit IV-4 provides a breakdown of TPM service costs by expense items as a percentage of total revenues. In contrast to a "typical" manufacturer's service organization, labor costs constitute a much larger proportion of total costs, for a number of reasons. First, TPMs typically service smaller and older equipment that does not feature the same degree of remote support functionality as equipment serviced by TPM's manufacturer-based counterparts. Second, TPMs predominantly perform hardware maintenance services (as compared to software support and professional services), which are more labor intensive.

EXHIBIT IV-4

EXPENSE BREAKDOWN OF TYPICAL TPM SERVICE ORGANIZATION
(By Expense Item as a Percent of Revenues)



At the same time, parts costs are almost as high, since TPMs need to assure themselves of having the needed part. As a result, TPMs need to look to all sources of spares, including fourth-party maintenance (FPM) sources and even TPMs' own customers.

The other functions (and requirements) within a TPM organization are otherwise fairly similar to those of manufacturer-based service organizations. As TPMs expanded and matured, they expanded their marketing and sales functions to be able to compete with each other and the manufacturers from which they hoped to draw business. Most major TPMs now make frequent use of print advertising in both service-related and general business-related magazines, whereas smaller local TPMs concentrate on newspapers and radio advertisements.

In the future, TPM labor costs should decline as TPMs service more equipment that features remote support technology. Some TPMs are already developing their own remote diagnostic tools, and others should be able to purchase systems from third-party suppliers that have developed such systems. However, labor costs for the TPM industry will always be higher than those of manufacturer-based service organizations.

Parts costs for TPMs should increase because TPMs, by expanding their service coverage into new products, will need to purchase increasingly

expensive spare parts. It will be interesting to see the outcome of many of the current (and future) litigation attempts by TPMs against manufacturers regarding spare parts pricing, particularly as the supply of more expensive spares shrinks and prices increase.

Material costs are expected to grow at a faster rate than labor costs will fall. In order to protect margin levels, TPMs will need to make structural and procedural changes. First (and foremost), most TPMs will find their logistics and dispatching systems lacking the functionality required to perform productive service. As a result, most TPMs will need to develop or purchase centralized systems that integrate existing support functions—such as dispatching, parts tracking, and customer information—with more-advanced functionality, such as remote diagnostics (supplemented by AI and expert system tools) and support delivery capabilities. In recognition of this need, major TPMs, such as TRW and GE Computer Services, have already upgraded their current systems.

Also, TPMs will need to address the issue of rising spare parts costs and the potential for shortages of needed spare parts. Improved tracking control provided by new service management systems will help, but TPMs will need to follow manufacturer-based service organizations' lead by centralizing spare parts inventories. This will require TPMs to establish relationships with overnight express companies, as well as increase their involvement with FPM companies.

B

Service Productivity Trends

Service organizations have seen increased product reliability and advancements in service technology that reduce the need for on-site service. Increased competition, combined with pressure from users to lower service prices, has reduced service revenue projections. As a result, some vendors have been forced to reduce service staff. These factors have caused service organizations to place increased focus on service productivity.

One widely accepted measurement of service productivity is the ratio of service revenue to service employee, and the ratio of service revenue to field engineer (FE). The higher the revenue contribution per employee (or per FE), the more productive the service organization.

Exhibit IV-5 compares manufacturer-based service productivity to TPM service productivity. On the basis of 1987 revenue information, the average revenue per manufacturer-based service employee was approximately $160 thousand, versus $80 thousand per TPM service employee. Manufacturer-based FEs contributed $250 thousand each, versus $130 thousand per TPM FE.

EXHIBIT IV-5

SERVICE PRODUCTIVITY MANUFACTURER VERSUS TPM

Service Organization Type	Average Service Revenue Size ($000)	Rev/Service Employee ($000)	Rev/FE ($000)
Manufacturer	840	160	250
TPM	130	80	130

Manufacturers: IBM, Amdahl, NAS, NCR, Concurrent, DG, Harris, and Stratus

TPMs: CDC, Dataserv, Decision Data, GE, Grumman, Servcom, Intelogic Trace, Sorbus, TRW

There is an obvious reason for the disparity in service efficiency between manufacturer-based service organizations and TPM service organizations. First, a greater share of TPM service is performed on peripherals, microcomputers, and older equipment that does not incorporate remote support and other advanced technology. As a result, the TPM FE has to spend more time on-site performing diagnostic and repair actvities.

An indication of the impact that increased remote support technology has had on improving service productivity can be seen by comparing the current manufacturer-based revenue per FE, $252 thousand, to that reported in INPUT's 1982 Field Service Annual Report, $91 thousand.

The 1982 report did not look at TPM, but in INPUT's first report on TPM, *Third-Party Maintenance, Volume 1: Vendor Services and Markets, 1984-1989,* INPUT reported that the average revenue contribution per TPM FE was only $55 thousand. Thus, TPM service organizations have also demonstrated significant increases in service productivity.

Exhibit IV-6 presents productivity measurements based on service revenue and employee information from selected service organizations.

EXHIBIT IV-6

SERVICE PRODUCTIVITY OF SELECTED SERVICE ORGANIZATIONS

Company	1987 Service Revenues ($M)	No. Service Employees	Rev/ Service Employee ($000)	No. FEs	Rev/ FE ($000)
IBM	3,688 †	27,000 †	136	18,000 *†	205
DEC	3,934 ††	42,000 ††	94	N/A	N/A
Amdahl	125 †	856 †	146	410 †	305
NCR	1,952	10,000	195	6,000	325
Data General	424	2,005	211	1,000	424
TRW	255	2,100	121	1,300	196
Sorbus	220	2,300	96	1,000	220
Intelogic Trace	135	1,525	89	641	211
GE	198 *	1,800	110	700	282

*INPUT Estimate
†U.S. Figures
††Consolidated Figures

C

User Service Requirement Trends

In 1988, INPUT interviewed 780 users of large and small systems regarding their service and support needs and satisfaction with their service vendor. Since 1983, INPUT has measured vendor performance regarding system availability (also referred to as uptime) since 1983. From 1983 to 1986, large- and small-system vendors have been successful in meeting the steadily increasing system availability requirements of their users (as shown in Exhibits IV-7 and IV-8). In 1987, large-system users reported a drop in average system availability received, while small-system users reported no change in system availability received, and both user groups reported increased requirement levels. In last year's report, *Service Market Analysis, Large and Small Systems*, INPUT commented that

service vendors would not be able to approach their users for additional service revenues (in the form of higher prices) if service performance in this vital area dropped.

EXHIBIT IV-7

LARGE-SYSTEMS SYSTEM AVAILABILITY 1983-1988

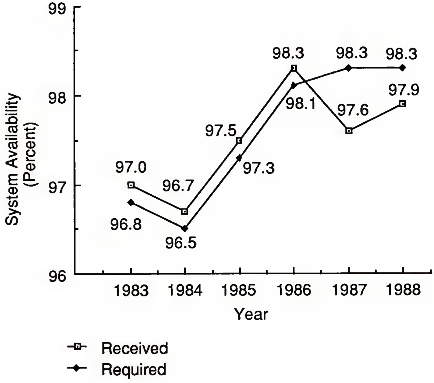
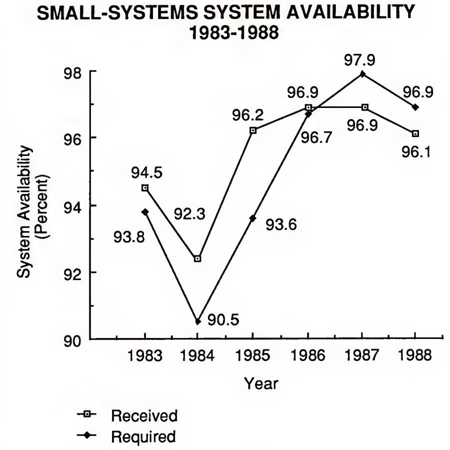


EXHIBIT IV-8



The drop in large-system system availability could have been cased in part by increased user involvement called for in IBM's 1987 (actually announced in late-1986) Corporate Service Amendment (CSA). Large-system users surveyed in 1988 reported that they received higher system availability. If 1987's drop in large-system availability was caused in any way by increased user involvement, then 1988's results may suggest that large-system users were becoming more comfortable with their new requirements. At the same time, the percentage of large-system users satisfied with system availability increased from 56% in 1987 to 62% in 1988.

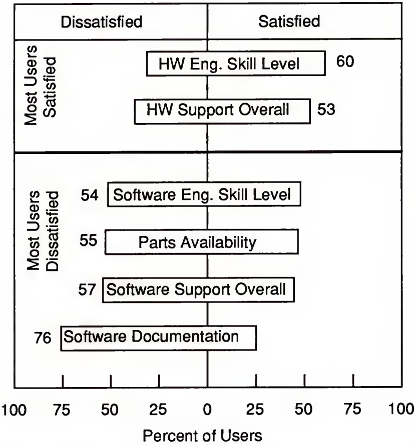
Small-system users reported a drop in system availability in 1988, which coincidentally is when IBM's Midrange System Availability Amendment (MRSA) took effect. All told, 56% of all small-system users were satisfied with their system availability, down from 1987 (when 59% were satisfied) and 1986 (when 70% were satisfied).

User satisfaction with many key service areas is also lagging. Exhibit IV-9 indicates that large-system vendors are successful at satisfying a majority of their users' requirements in only two high-priority areas: hardware engineer skill level and overall hardware maintenance. Large-

system vendor performance is weakest in the area of software documentation, where only 24% of the sample was satisfied (down from 41% in 1987). Large-system user dissatisfaction with documentation tends to be increased by less-than-satisfactory performance by the software support engineer; as a result, overall satisfaction with support suffers.

EXHIBIT IV-9

LARGE-SYSTEM USER SATISFACTION WITH HIGH-PRIORITY SERVICES

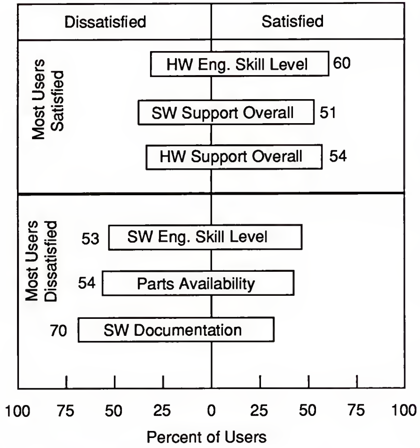


Software documentation appears to be problematic in the small-systems market, as shown in Exhibit IV-10, but not to the extent in the large-systems market. In fact, small-systems vendors were able to satisfy the majority of their users in the area of overall software support, even though 70% of the small-systems users reported that they were dissatisfied with their documentation.

If software documentation is a pervasive problem in the large- and small-systems markets, service organizations must improve user satisfaction. In almost all cases, the service organization has virtually no involvement in the development, production, and delivery of the software documenta-

EXHIBIT IV-10

SMALL-SYSTEM USER SATISFACTION WITH HIGH-PRIORITY SERVICES



tion. Yet user inability to use the documentation impacts the service organization, which has to take the dissatisfied customer's initial call. Service organizations must take responsibility for increasing their involvement in the design, testing, and quality control of all software produced by the company.

D

Manufacturer versus TPM Competition

Early in the development of the TPM industry, TPMs typically targeted products (micros, "foreign" peripherals, products from manufacturers without service organizations, and older equipment) that the major manufacturer-based service organizations did not focus on (to any great extent). As a result, manufacturers tolerated TPM growth, even as some TPMs began siphoning off some of the manufacturers' current customers (some manufacturers viewed TPMs as a benefit, since they usually removed price-sensitive, dissatisfied customers from their user base).

As the TPM industry grew, TPMs found that they had the tools to compete with manufacturers for newer and larger products. Using attractively discounted service pricing as a lure, TPMs began penetrating closer to the heart of the manufacturer's service business. Not only were TPMs cutting into the manufacturers' service revenue base, but also TPMs increased all users' price sensitivity by means of across-the-board discounting.

The first major indication that manufacturers were growing tired of TPM penetration came in 1983, when IBM introduced a test program called the Enterprise Maintenance Agreement (EMA). EMA offered selected large IBM users significant discounts if the user demonstated the ability to perform rudimentary disgnostic and support activities. The program was discontinued with the announcement of the Corporate Service Amendment.

In October of 1986, IBM announced the Corporate Service Amendment (CSA). CSA offered discounts of up to 45% of the annual maintenance charge if users demonstrated system management capabilities (problem management, change management, network management). Later CSA was also extended to provide 24-hour by 7-day (24/7) service coverage.

In 1987, IBM announced the small-system equivalent to the CSA, called the MRSA. Also in 1987, IBM extended all system service contract coverage to 24/7, eliminated off-hours T&M service (reportedly as a result of better focusing their resources to contract customers, who had just had their coverage extended to 24/7), reduced the number of locations where people (including TPMs) could purchase spares, and increased charges for "emergency" spares orders.

In 1988, IBM stepped up its efforts to recover service customers lost to TPM. In June 1988, IBM announced a prepayment discount plan, the Extended Maintenance Option (EMO), which offered discounts ranging from 11% to 26%, depending on product and length of contract. EMO also guaranteed maintenance prices for the duration of the contract. EMO discounts could be added to CSA/MRSA contracts, provided that they ran the same length of time.

Later in 1988, IBM expanded the level of multivendor service offered with its Technical Services Management offering, a three-option plan that basically offered IBM management (and in some cases, IBM service) on all covered products at a user site.

Other manufacturers have also moved to address the single-source support requirements of their customers (and, in the process, remove a sales differentiation from TPM sales pithces).

After IBM announced the CSA program, major TPMs were forced to offer similar services. TRW, Sorbus, CDC, and Intelogic Trace all

offered competitive programs that attempted to outdo IBM by dropping some of the more restrictive aspects of CSA (e.g., the help desk, initiation fees, etc.). Other TPMs declined to match IBM, pointing out that their pricing was already substantially below IBM's prior to CSA and, even with CSA, their pricing was comparable, if not slightly lower than CSA prices.

In 1988, TPMs competing in the IBM product market moved to compete with IBM in other ways. Intelogic Trace matched IBM's 24/7 contract coverage on System/3X service, and also offered guaranteed responses times for System/3X customers. IDEA Servcom announced a risk-free plan for System/3X and 43XX users called ServiceFIRST, which users can try for 90 days without paying for service (the customer is billed in arrears for a one-year contract at the end of the first 90 days).

Other TPMs turned their focus to other manufacturers' products (frequently DEC and Wang) or other areas of service, such as the fourth-party maintenance (FPM) market or OEM and VAR support.

TPMs also attempted to strike back in the courts, most often citing violations of the Sherman Antitrust Act, which prohibits unreasonable restraint of trade. In 1986, TPM and refurb specialist Allen Myland Inc. (AMI) filed suit against IBM, charging that IBM violated the Sherman Act by bundling parts and labor into one charge for 308X upgrades and, in 1980, by instituting an installation and warranty service charge for 308Xs shipped between countries. Integral to AMI's case was the definition of the size of the mainframe market, which AMI used to allege that IBM monopolized. On July 21, 1988, the U.S. District Court in Philadephia dismissed the case, ruling that IBM's pricing practices were fair and reasonable business practices. Furthermore, the ruling held that AMI's definition of the market was too restrictive and that AMI had a much larger potential base of products to service.

At last report, AMI has filed another suit against IBM over the right to copy microcode and was recently successful at getting the Philadelphia district judge who ruled on the first case to allow AMI to petition another district court in New York to hear the case. Both sides are awaiting that court's decision on whether it will agree to hear the case.

Hewlett-Packard had two major lawsuits filed against it, both plaintiffs represented by TPM litigation specialist Ron Katz of Coudert Brothers. The first, Datagate vs. HP, filed in January 1986, charged HP with unfair business practices but was dismissed by a San Jose federal district court, which ruled that Datagate had not substantiated its charges. The judge in the case, however, had a possible conflict of interest (he reportedly has a son who has worked for HP for 15 years). More recently, the judge allowed Datagate to file a claim against HP in a state court if it so chooses.

The second case, HyPoint vs. HP, filed in February 1988, has recently concluded the discovery period (when parties exchange testimony and evidentiary documents against each other); a ruling on the case is not expected until later in 1989.

Grumman System Support Corporation (GSSC) filed suit against Data General on July 18, 1988, charging DG with monopolizing the maintenance market for MV series and Micro NOVA computers by requiring customers who buy DG diagnostic software for their systems to also buy DG maintenance contracts. GSSC claimed that at one time DG agreed to sell its Adex diagnostic software to GSSC; however, Grumman stated that DG began restricting the availability of the software in 1987. GSSC claimed that by these restrictions DG made it impossible to compete for that DG service. DG claimed that the suit is a response to an earlier lawsuit filed by DG against GSSC. The earlier suit charged infringement of the diagnostic software copyright and trade secret theft. The current case has entered the discovery period.

Other manufacturers have charged TPMs with similar copyright infringements involving the use of diagnostic software. In 1987, DEC settled a lawsuit filed in late 1986 against DSI Computer Services (the suit attempted to bar DSI from using copyrighted diagnostic software for servicing VAX systems). Terms for the settlement required DSI to acquire licenses for DEC VAX diagnostic software and to pay DEC an undisclosed amount for DSI's prior use of DEC diagnostic software.

Some independent vendors have already begun developing their own diagnostic software tools for popular systems. TRW, for example, has developed a catalog of DEC VAX diagnostic software system that they sell. CDC has developed its own proprietary diagnostic tools for DEC systems, along with a set of system management and system performance tools offered to DEC users under the ProAct service family.

Exhibit IV-11 lists major litigations in these areas and summarizes their current status.

EXHIBIT IV-11

MAJOR TPM/MANUFACTURER LITIGATIONS

TPM versus Manufacturer

Litigants	Status
AMI vs. IBM	Dismissed
AMI vs. IBM	Request for New Venue
GSSC vs. HP	Pending
HyPoint vs. HP	Pending
Datagate vs. HP	Dismissed
Etek vs. Picker Intl.	Pending

Manufacturer versus TPM

Litigants	Status
DEC vs. DSI	Settled
DG vs. GSSC	Pending

E

1988: The Year in Review

The following section chronicles major news from the customer services industry for 1988.

EXHIBIT IV-12

1988: THE SERVICE YEAR IN REVIEW
(January-March)

Date	Item
Jan. 1988	• MAI "Buys Back" MAI Service form Sorbus
	• Sorbus Lays Off 600-650 Employees
	• CDC Matches IBM 24/7 Coverage
	• Prime Bids for Computervision
	• IBM Realigns Rolm Service Organization
	• Onset Corp. Considers Combining Decision Industries with Momentum
	• IBM Restructures into Six Organizations
Feb. 1988	• Sorbus Eliminates 700 Management and Staff Postions
	• Memorex Purchases Telex
	• IBM Raises Hourly Service Rates 15%, Contract Rates 7-15% on Selected Products
	• IBM Announces COS Site Management Service
	• Prime Announces 24% Increase in Service Revenues
	• DEC Announces 29% Increase in Service Revenues
Mar. 1988	• Tandy Buys Grid Systems
	• IBM Buys PacTel Spectrum Services
	• DG Announces 7% Increase in Service Revenue
	• IBM Announces Drop in U.S. Service Revenues

EXHIBIT IV-13

1988: THE SERVICE YEAR IN REVIEW
(April-June)

Date	Item
Apr. 1988	• DPCE Acquired by Granada Group Plc.
	• Dataserv Lays Off 66 Employees
	• TSSI Lays Off 60 Employees
May 1988	• Computerland Steps Up Efforts to Sell Service to National Accounts
	• HP Announces Service Revenue Growth of 20%
	• CDC Offers Proact Software Support
June 1988	• Datagate's Lawsuit against HP Dismissed by San Jose Federal Court
	• Prime Announces Priority Replacement Service
	• IBM Unveils AS/400 ("Silverlake")
	• Intelogic Trace Offers Guaranteed Response Times for System/3X Users
	• IBM Offers Extended-Maintenance Option Prepayment Discounts

EXHIBIT IV-14

1988: THE SERVICE YEAR IN REVIEW
(July-September)

Date	Item
July 1988	• Bell Atlantic Acquires CPX
	• AMI Suit vs. IBM Dismissed
	• DEC Offers New Bundled Service Plans
	• Grumman Sues DG for Antitrust Infractions
	• Datagate Suit vs. HP Dismissed
Aug. 1988	• IBM Expands TPM Capabilities with Technical Services Management
	• HP Announces Multivendor Support Offering
	• CDC Offers Third-Party Software Support Offerings for IBM Software
	• TRW Acquires 3M TPM Business
	• Intelogic Trace Offers Guaranteed Response Times and Expands System/3X Coverage to 24/7
Sept. 1988	• DG Offers Multiyear Service Plans
	• Sorbus Acquires Computer Maintenance Co. (Toronto)
	• Hitachi Establishes Own U.S. Support Centers
	• IBM Announces Telecommunications Support Offering

EXHIBIT IV-15

1988: THE SERVICE YEAR IN REVIEW
(November-December)

Date	Item
Nov. 1988	• IDEAssociates Acquires Servcom
	• GE Computer Services Put Up for Sale
	• Decision Industries Merges with Momentum, Forms Decision Data Inc.
	• Ex-Sorbus Directors Form ICSS
	• DEC Changes Warranty Policy, Results in 6-9% Increase for Previous Support Level
Dec. 1988	• Bell Atlantic Acquires Dynservice Network
	• Sorbus Announces Layoff of 100 Employees
	• CDC Announces New VAX 8XXX Service
	• IDEA Servcom Announces "Risk Free" System/3X and 4300 Service
	• AMI Files New Antitrust Suit against IBM over Microcode Copying Rights

V

Recommendations and Conclusions

V

Recommendations and Conclusions

A

Focus Items for Future Growth

In conclusion, INPUT foresees a future customer service market that is becoming increasingly competitive, and, as a result, less conducive to the substantial year-to-year growth rates enjoyed by service organizations in the past. Instead, customer service prices, driven by IBM's price reductions, discount programs, and policy announcements over the past few years, have and/or will significantly cut into most service organizations' service margins.

Exhibit V-1 summarizes the current customer service market environment. As mentioned previously, IBM has made a number of major policy and pricing maneuvers (e.g. CSA, MRSA, expanded contract coverage, etc.) that have not only brought its service pricing in line with TPM competition but significantly reduced the entire "cost-of-ownership" for their systems, thus further improving the attractiveness of its products in the eyes of potential product customers.

EXHIBIT V-1

EFFECT OF PRICING CHANGES ON SERVICE MARKET

- IBM Drives Down Service Price "Umbrella"
- Competitors Feeling Pressure to Follow IBM's Lead
- Service Price Cuts Reduce Total Cost-of-Ownership
- Market Changing from "Sellers" to "Buyers"
- User Equity will Emerge as Key Issue

Competitors of IBM, particularly on the manufacturer side, have felt increasing pressure to follow IBM's lead in reducing service prices (and thus the total cost-of-ownership). This in turn puts pressure on service organizations to improve productivity, because user requirements for service and system availability continue to rise.

In effect, the market is quickly changing from a "vendor's" market, where the service organization controls the type and price of service, to a "user's" market, where the user is demanding low service prices and high service quality.

In light of this, all service organizations must adopt the following basic objectives (listed in Exhibit V-2) for continued growth. First, service vendors must structure their service offerings in a way that addresses the user objective of highest system availability at the lowest cost. To do so, the service organization must broaden its service offering to include any activity that provides or enhances system availability. Service organizations may find it necessary to use mergers, acquisitions, or other strategic partnering techniques to provide the desired services and reduce service costs by increasing the economies of scale of performing service.

EXHIBIT V-2

KEY SERVICE OBJECTIVES

- Highest Availability at Lowest Cost
- Broadened Service Offerings to Provide or Enhance Availability
- Use of Merger/Acquisition as Hedge against Rising Cost Pressures and as Means to Increase Economies of Scale

Exhibits V-3 through V-7 provide specific strategic focus items for manufacturer-based and third-party maintenance service management. For example, hardware product managers must view service as a way of reducing the overall cost-of-ownership (thus becoming a sales differential) and as a way of meeting the product availability requirements of users. Product design changes and advances (e.g. modular design, remote technology, improved user interfaces that ease self-maintenance) can work towards achieving this end, but to allow continued provision of low prices, it also requires improved productivity in the delivery of service. The final goal, of course, is improved account control, for future service and product sales.

EXHIBIT V-3

HARDWARE PRODUCT MANAGERS FOCUS ITEMS

- Lower Total Cost-of-Ownership
- Higher System Availability
- Greater Account Control

Software product managers must also work towards increased system availability requirements. First and foremost, software documentation must be improved to address continuing user dissatisfaction (as revealed in INPUT's ongoing user research) as well as to reduce the costs of providing support to users who cannot understand the documentation.

At the same time, users perceive low importance of operational training, preferring to save money by taking whatever initial training may be provided (for free) and handling ongoing training needs in-house. This preference, coupled with poor documentation, places additional burdens on the technical support function within the support organization.

Software support can be developed right into the product itself in the form of increased remote support (best typified by IBM's newest small system, the AS/400 Electronic Customer Support offering)

EXHIBIT V-4

SOFTWARE PRODUCT MANAGERS FOCUS ITEMS

- Improve Documentation
- Increase User Acceptance of Training
- Increase Use of Remote Support (i.e., AS/400)

As service pricing competition cuts deeper into service revenue growth prospects, service business managers must identify new sources of revenue growth. Existing markets can be tapped for revenue growth by broadening the current service offering to include high-requirement areas such as network design, planning, and management services. Additional

revenue growth can be accessed by penetrating new service markets, such as VAR incentive programs and multivendor services. Expanding the service offering while lowering basic maintenance charges will also deter further penetration by TPM and possibly win some customers back.

Service business managers must also address the need to reduce costs of service by reducing the administrative complexity involved with managing service. Examples of such simplification of service administration are extended service coverages (i.e. 24-hour by 7-day standard coverage), elimination of incremental maintenance charges, long-term contracts, and prepayment discounts. These changes reduce the administrative headaches and overhead costs for the vendor while providing users with reduced service costs and simplified, more comprehensive service coverage.

From a strictly business management standpoint, customer service management must also address the issue of possible inequities in the pricing and delivery of service caused by discounting and policy actions resulting from this increasingly competitive service environment.

EXHIBIT V-5

SERVICE BUSINESS MANAGERS FOCUS ITEMS

- Broadened Service Offerings (e.g., Network Management, Network Design)
- Alternative Revenue Opportunities (e.g., multivendor service, VAR support)
- Deter TPM Penetration
- Reduce Administrative Complexity
- User Equity Concerns

Third-party maintenance organizations are faced with more unique concerns (highlighted in Exhibit V-6). They must concern themselves not only with increased competition from manufacturers that offer multivendor service (most recently offered by IBM and HP) but also with aggressive pricing and policy changes from manufacturer-based service organizations that have decreased the favorable service price differential previously used in TPM sales efforts.

EXHIBIT V-6

TPM SERVICE ENVIRONMENT

- Increased Competition from Manufacturers
- Decreased Price Differential from Manufacturers
- Less Access to Parts, Diagnostics, and Documentation
- Reduced Service Margins

Exhibit V-7 presents specific recommendations for TPM service management. First and foremost, TPMs must expand their service offerings. TPMs need to increase the list of brands and equipment types they cover to better differentiate their capabilities from manufacturers that now offer multivendor support. TPMs can continue to emphasize the benefit of their impartiality (as a "independent" service provider), which will help them maintain alliances with certain manufacturers (and will assure the flow of needed parts and documentation).

EXHIBIT V-7

TPM SERVICE MANAGERS FOCUS ITEMS

- Expand List of Vendors, Product Types, Services Offered
- Move towards Market Niche
- Increase Use of Automation
- Continue to Form Strategic Relationships

More importantly, TPMs will need to expand the types of services that they offer in order to lessen their dependence on traditional hardware maintenance revenue sources (which are becoming increasingly competitive). TPMs can also benefit from strategic partnering to access and exploit these new service market areas, particularly in areas that are currently difficult to penetrate due to market factors (e.g. the shortage of skilled telecommunications specialists acting as a limiting factor in penetrating the telecommunications support market).

TPMs should also attempt to differentiate their service offerings wherever possible by customizing their support offerings to specific market niches. This process can be facilitated by examining product usage trends and requirements in a specific industry and then providing product coverage and service offerings that are attractive to those users.

Wherever possible, TPMs need to weather the "storm" of manufacturer-based policy and pricing changes by reducing the costs of providing services. Many large TPM service organizations have already made strides in improving their service management systems (dispatching and logistics), but further use of automated service delivery systems is needed.

B

Professional Services

Faced with slowing growth rates in hardware maintenance revenues caused by increased hardware reliability, increased competition, and increased pricing pressure from users, many service organizations have identified the area of professional services as an important growth market of the future.

While specific activities may vary among different vendors' offerings in the professional services area, the basic concept defining professional services is as follows: professional services can be defined as any service performed (for fee) that improves the performance of that system. For the sake of this forecast, INPUT refines that definition to include only those services that are appropriately managed or performed by the service organization that affect the system's support requirements or ability to be serviced. Those activities include planning (environmental, site, and installation), consulting (specifically performance optimization, network planning and design, and network implementation or cabling), training (specifically on the maintenance of the system), relocation and reinstallation, and site management (also known as multivendor service coordination).

Exhibit V-8 presents INPUT's forecast for professional services as related to customer services. INPUT believes that these relatively high growth rates are reasonable due to growing user demand for increased system reliability and availability, as well as increased user activity in these support areas. For example, IBM announced three major professional service offerings in 1988. The first, Customized Operational Services (COS), is a series of site management and planning services that include site readiness services, contractor services, installation management, cabling, data center evaluation and design consulting, and relocation planning and management services. In keeping with the highly customized nature of professional services, IBM prices COS on a case-by-case basis.

EXHIBIT V-8

PROFESSIONAL SERVICE MARKET FORECAST 1987-1993

Product	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1988-1993 CAGR (Percent)
Large*	310	350	400	470	580	720	900	21
Small**	360	410	470	540	650	810	1,050	21
Total	670	750	870	1,010	1,230	1,530	1,950	21

*Based upon 6% of Large-System Service Revenue
**Based upon 5% of Small-System Service Revenue

A second major professional service offering that IBM announced in 1988 was its Technical Services Management program, under which IBM provides multivendor support for users, either subcontracting the service or, at IBM's discretion, offering the third-party service themselves.

A third major offering announced by IBM in 1988 was Telecommunications Services, Network Support. This offering provides TSM-like multivendor support on a wide range of telecommunications and data communications products. Services range from network problem identification to fix verification from IBM's Network Support Center.

In 1988, Digital Equipment Corporation also announced two series of multivendor services. Enterprise-Wide Services is a comprehensive package of planning, program management, and integrated support services that draws from selected service alliances that DEC expects to sign with leading service vendors. DEC also announced a Network Enterprise Management Program, which will serve as a platform for existing network planning and support services, as well as add new services that result from alliances signed with leading telecommunications vendors.

Hewlett-Packard also entered the world of multivendor service in 1988, by introducing its Multivendor Support Operation and a Strategic Partners Program, which is designed to attract OEMs with little or no service presence.

Third-party maintenance organizations also recognized the need to compete in the professional service market. CDC's third-party organization introduced a operating system software maintenance planning and management service called Total Operating Performance Package (TOPP).

C

Reconciliation with Previous Year's Forecasts

In this section of the report, INPUT reconcils this year's customer service forecast with the forecasts presented in last years Customer Service Program reports, *Service Market Analysis—Large and Small Systems*, *Service Market Analysis—Third-Party Maintenance*, and *Service Market Analysis—Software Support.*

1. Definition of Customer Services Market

Last year's studies attempted to use as broad a definition of customer support as possible in order to encompass possible growth areas. Client interest in specific service niche areas often resulted in the addition of that niche area into the definition of customer services. As a result, the 1987 service market definition included such niche areas as software support (discussed in greater detail later in this section) and operational training.

For the purposes of the 1988 market forecasts, customer services are defined as follows: any hardware-related service, including remedial and preventive hardware maintenance, and any professional service related to the performance of the hardware system. Those professional services include: planning (environmental, site, and installation), consulting (specifically performance optimization, network planning and design, and network implementation or cabling), training (specifically on the maintenance of the system), relocation and reinstallation, and site management (also known as multivendor service coordination).

2. Product Coverage

In 1987 (and in previous years), INPUT estimated the service markets of the following large systems (comprising supercomputers, minisupercomputers, mainframes), small systems (comprising superminicomputers, and traditional minicomputers), microcomputers (business only), peripherals (specifically disk drives, tape drives, terminals, and printers), telecommunications products (specifically modems, front-end processors, switches, and networks), and other products (including word processors and workstations).

In 1988, INPUT adjusted the product coverage to better reflect functional competition between product types and installation information available to INPUT. As stated in Chapter III's description of the forecast methodology used in 1988, INPUT based its product breakdown on typical

installation data available to INPUT. This installation data included product and servicing prices of telecommunications products typically attached to a large or small system, such as switches and front-end processors (as these were usually manufactured by the system vendor). As a result, INPUT found it more consistent with large- and small-system installations to include any telecommunication device in the peripheral service forecast. Accordingly, INPUT dropped the telecommunications category from the forecast. For the sake of the TPM forecast, INPUT endeavored to provide a estimate of TPM service of telecommunications products as a percentage of total TPM performed (based on selected survey results).

INPUT also recategorized the microcomputer service market by including workstations (from such vendors as Sun, Apollo, and Altos) to better reflect the competition for applications between these systems and increasingly powerful microcomputers. At the same time, INPUT dropped word processors from the forecast, thus eliminating the "other" category.

The reclassification of workstations and telecommunications products had no effect on the overall customer service forecast. Removing word processors from the forecast eliminated an estimated $430 million from the overall customer service forecast.

3. Forecast Methodology

In deriving base year forecast data in 1987 (and in previous years), INPUT used a basic methodology similar to the one used to forecast the overall base year size of the U.S. customer service market for this year's study (as explained in detail in Chapter III). The two methodologies differed in how the next year's forecast (which is the starting year in the five-year forecast) was derived. In previous years, the forecast was prepared much earlier in the year; as a result, the next year's forecast was based upon responding companies' estimates and previous years' growth rates. In 1988, the forecast process was started much later in the year, allowing the use of quarterly reports and other publicly available information for forecasting purposes. In addition, INPUT used survey information when it was made available to INPUT from selected companies; a responding company's own estimate of its year-end revenues was naturally much more accurate.

In 1987 (and in previous years), INPUT incorrectly identified certain parts of IBM's business operations as part of the company's service revenues. In addition to hardware maintenance revenues, INPUT added program products (which were incorrectly identified as being derived from license and separately billed software maintenance fees), federal systems service (which were incorrectly assumed to be derived from federal computer maintenance), and other services.

As a result of these incorrect additions to IBM's service revenue, INPUT overstated IBM's 1986 service revenue by $1.3 billion.

4. Software Support

INPUT's previous forecasts of the customer service market attempted to quantify user expenditures for software maintenance and support. In 1987, INPUT forecasted the current software maintenance support market for both systems and software support as being $3.3 billion, growing to $10.9 billion by 1992 (as presented in INPUT's 1987 report *Service Market Analysis—Software Support*).

INPUT's customer service forecast published software support user expenditures likely to be accrued by system manufacturers. As a result, operating system software (also referred to as system control software) user expenditures were included in the customer service forecast presented in the 1987 report, *Service Market Analysis—Large and Small Systems*. User expenditures from the support of operating system software contributed $1.43 billion to the 1987 customer service forecast (this includes $40 million attributed to all forms of TPM software support).

In analyzing the activities commonly accepted as software support, it was concluded that when software support is separately billed for, the majority of software support revenue is derived from product revisions and upgrades, and only a small percentage is derived from actual "fixes". As a result, INPUT does not feel it appropriate to measure software support user expenditures in the customer service forecast; rather, these expenditures are examined more fittingly in INPUT's Market Analysis Program (MAP), which tracks the software products market.

Furthermore, it is INPUT's belief that the software support must be delivered by software developer/distributor. Software doesn't wear out or break (as a hardware product may). As a result, any problem that develops must be either a design fault or the result of the customer not knowing how to use the software properly. Thus, design corrections that result from fixes are best performed by the developer/distributor of the software. With the possible exception of CDC, INPUT is aware of no other third-party provider of actual software maintenance. Thus, software support should be considered a "captive" market.

INPUT will continue to track both the sale and support of the U.S. software market, including those support-related activities identified by software vendors, in the company's MAP program. As a courtesy to clients of INPUT's Customer Service Program, Exhibit V-9 presents INPUT's MAP forecast of the U.S software product market, including support-related activities.

EXHIBIT V-9

SOFTWARE PRODUCT AND SUPPORT FORECAST 1987-1993

Software	User Expenditures							1988-1993 CAGR (Percent)
	1987 ($B)	1988 ($B)	1989 ($B)	1990 ($B)	1991 ($B)	1992 ($B)	1993 ($B)	
Application Total	10.6	13.0	15.3	18.1	21.5	25.8	31.0	19
• Sales	8.8	10.8	12.7	15.0	17.9	21.4	25.0	18
• Support	1.8	2.2	2.6	3.1	3.6	4.4	5.9	22
Systems Total	9.9	12.1	14.7	17.9	21.6	25.9	30.7	21
• Sales	7.9	9.7	11.8	14.3	17.3	20.7	24.6	20
• Support	2.0	2.4	2.9	3.6	4.3	5.2	6.1	21
Total Software	20.5	25.1	30.0	36.0	43.2	51.7	61.7	20
• Sales	16.7	20.5	24.5	29.4	35.2	42.1	49.6	19
• Support	3.8	4.6	5.5	6.6	7.9	9.5	12.1	21

5. Educational Services

INPUT's previous forecasts of the customer services marketplace attempted to quantify user expenditures for the training that they received on their system. In 1987, INPUT estimated the current size of that service area as $420 million, growing to $1.14 billion by 1992. The vast majority of those expenditures have been identified as operational training in nature, and as such, outside the usual sphere of the customer service organization.

Accordingly, INPUT will not include this service area in its 1988 forecast. Service-related training will be tracked and included in the professional services forecast.

By including operational training in INPUT's definition of customer services educational services, INPUT overstated the training revenue contribution in the 1987 customer services forecast by an estimated $360 million.